ESO 1095

A GUIDE TO UNDERSTANDING FARM PRODUCTION COSTS

Prepared by

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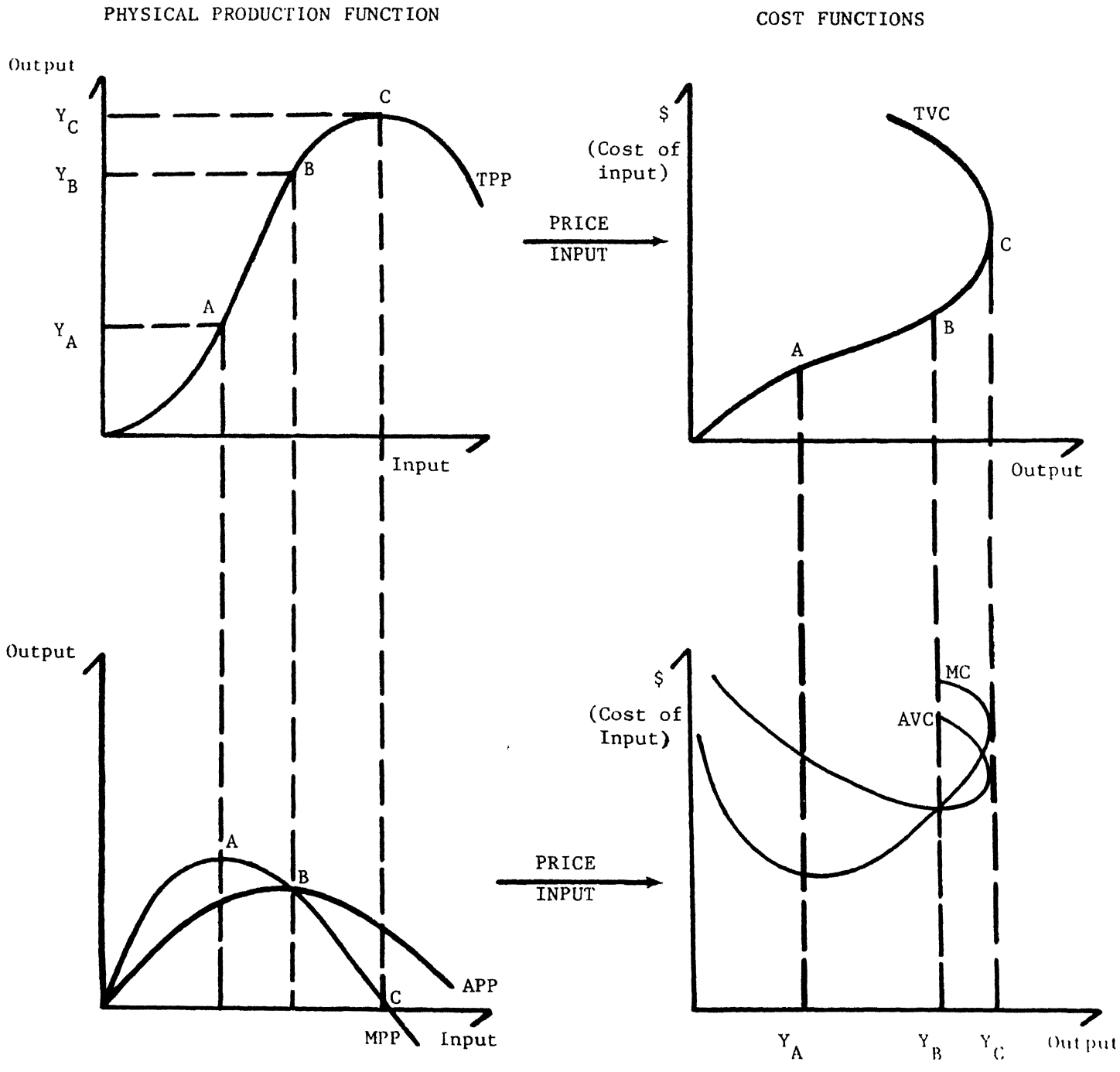
Figure 1: The Production Function and Cost Curves

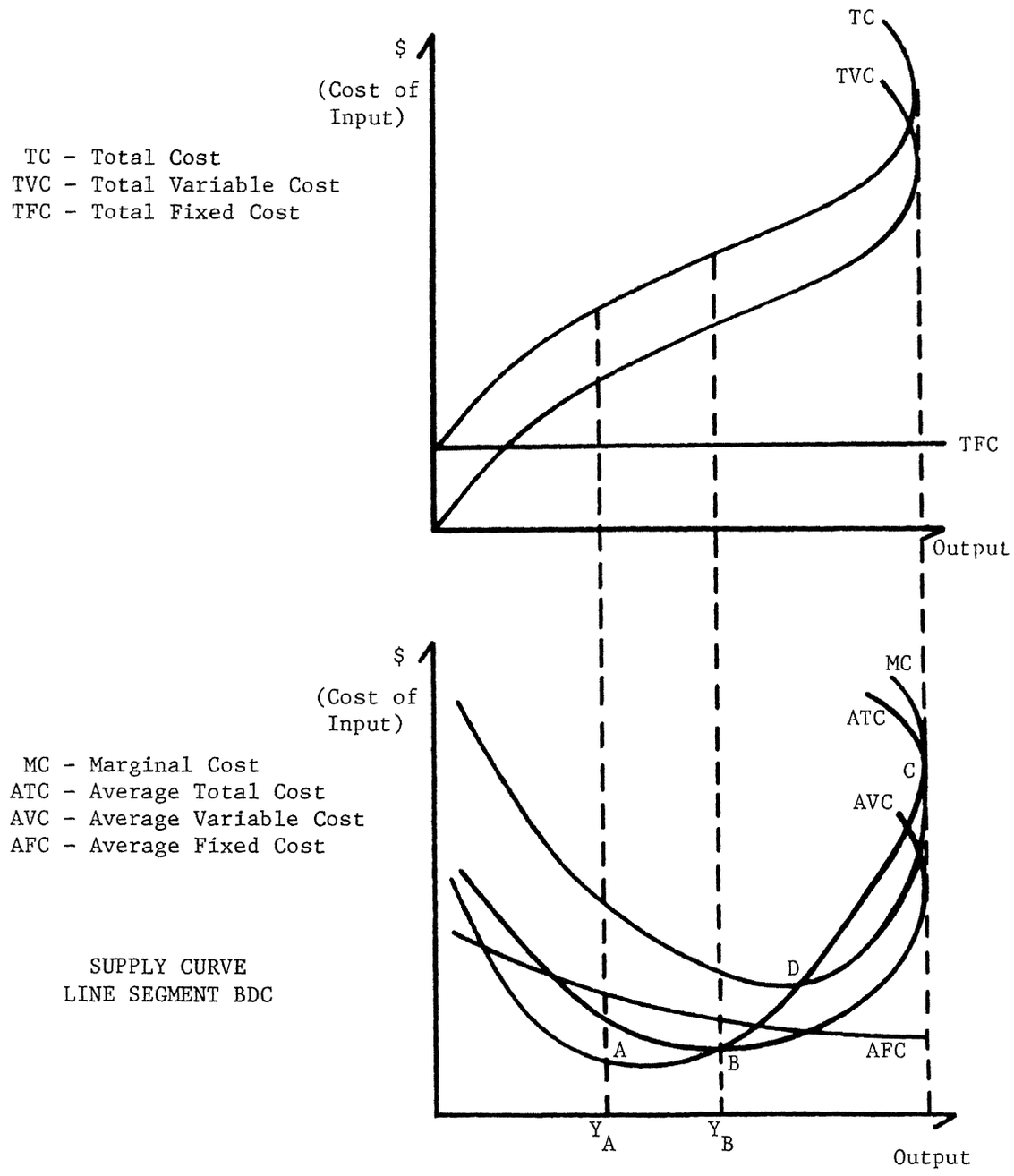


TPP - Total Physical Product
APP - Average Physical Product
MPP - Marginal Physical Product

TVC - Total Variable Cost
AVC - Average Variable Cost
MC - Marginal Cost

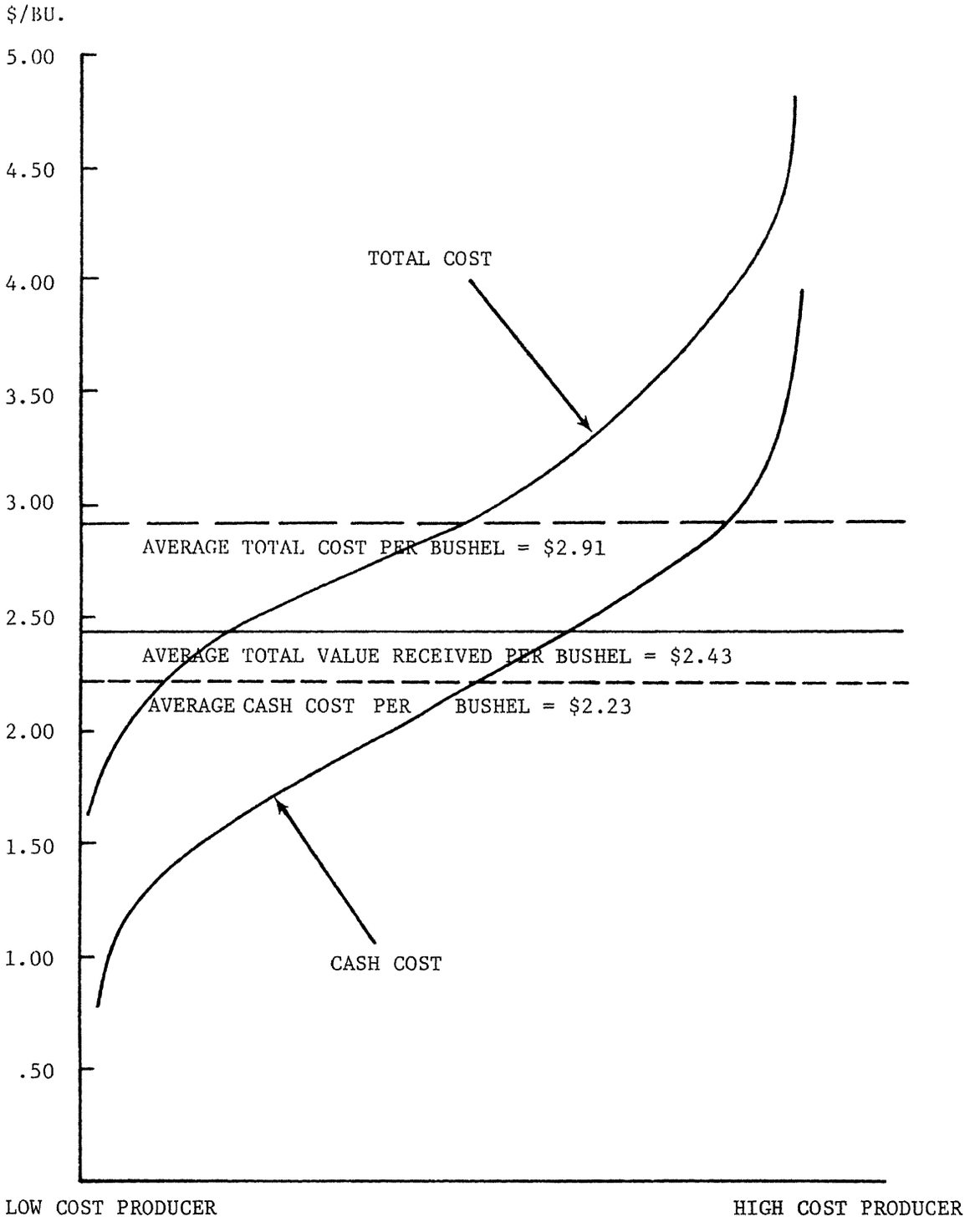
(Prepared by Carl Zulauf, Assistant Professor, The Ohio State University, 4/84.)

Figure 2. Total and Per Unit Cost Curves



(Prepared by Carl Zulauf, Assistant Professor, The Ohio State University, 4/84.)

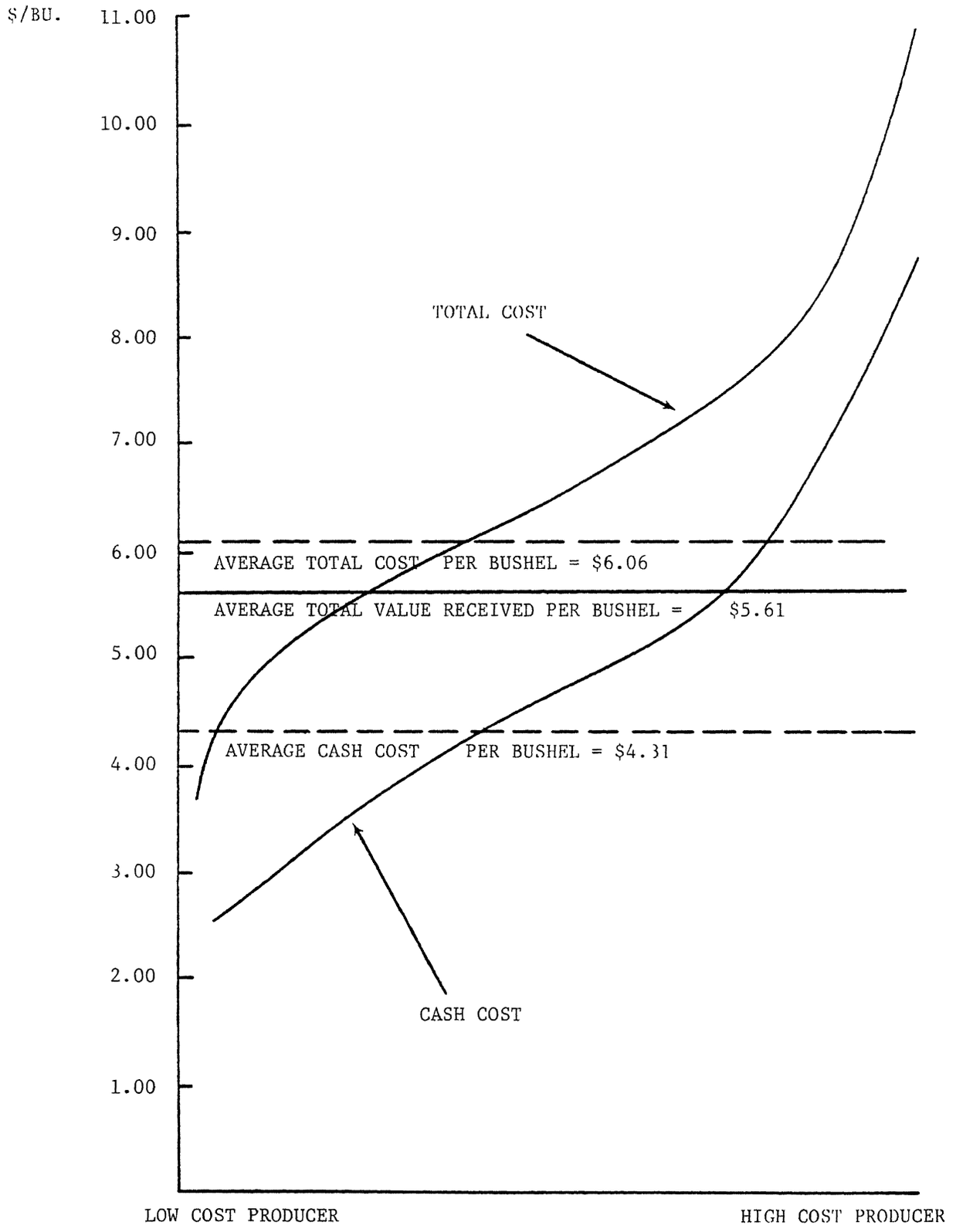
Figure 3: Distribution of Cash and Total Costs for 54 Corn Enterprises, Ohio, 1982.



Range of Costs: Cash - $.77 to $3.95 per bushel
Total - $.1.53 to $4.79 per bushel

Source: Farm Business Analysis Project, Department of Agricultural Economics and Rural Sociology, Ohio Cooperative Extension Service, The Ohio State University.

Figure 4: Distribution of Cash and Total Cost Curves for 28 Soybean Enterprises, Ohio, 1982.



Range of Costs: Cash - $2.58 to $8.68 per bushel
Total - $3.86 to $10.89 per bushel

Source: Farm Business Analysis Project, Department of Agricultural Economics and Rural Sociology, Ohio Cooperative Extension Service, The Ohio State University.

Table 1. Return Above Total Costs for Corn, Soybeans, and Wheat; Price of Farmland; Rental Value of Cropland; and Acres of Corn, Soybeans, and Wheat Harvested; Ohio, 1972-1982.

Year	Return Above Total Costs[a]			Price of Farmland ($/acre)	Rental Value of Cropland ($/acre)	Acres of Corn, Soybeans & Wheat Harvested (Thous.)
	Corn[b]	Soybeans (cents/bu)	Wheat			
1972	-6	60	-44	439	28.40	7,315
1973	41	163	117	505	29.20	7,570
1974	65	206	118	627	33.90	8,633
1975	37	82	-2	706	40.40	8,585
1976	10	155	-55	846	50.80	8,560
1977	-14	86	-103	1099	59.80	8,890
1978	-26	51	-41	1224	68.00	8,800
1979	-24	9	-9	1483	76.80	9,230
1980	20	23	-73	1678	81.80	9,245
1981	-38	-111	-159	1727	87.70	8,900
1982	-48	-45	-189	1474	88.40	9,040

[a]Average for Ohio farmers participating in The Ohio State University Farm Records Program.

[b]Corn for grain.

Sources:

The Ohio State University, Ohio Agricultural Research and Development Center (in cooperation with Ohio Crop Reporting Service, U.S. Department of Agriculture). Ohio Agricultural Statistics 1970-1975. Research Bulletin 1106. Wooster, Ohio. November 1978.

The Ohio State University, Ohio Agricultural Research and Development Center (in cooperation with Ohio Crop Reporting Service, U.S. Department of Agriculture). Ohio Agricultural Statistics 1976-1979. Research Bulletin 1139. Wooster, Ohio. October 1981.

The Ohio State University, Ohio Cooperative Extension Service, Department of Agricultural Economics and Rural Sociology. Farm Business Analysis Report, General Crop Summary. 1972-1982.

U.S. Department of Agriculture, Economic Research Service. Farm Real Estate Market Developments--Outlook and Situation. CD-88. August 1983.

U.S. Department of Agriculture, Economics, Statistics, and Cooperatives Service. Farm Real Estate Market Developments. CD 85. August 1980.

U.S. Department of Agriculture, Statistical Reporting Service, Ohio Crop Reporting Service. Ohio Agricultural Statistics. 1980-1982.

Table 2. Labor and Management Costs of Growing Corn, Central Illinois, Selected Years 1926-1982.

Year[a]	Per Acre Costs			Labor and Management Costs as a Percent of Total Costs
	Labor	Management[b]	Total Costs	
	- - - - $ - - - -			- - - % - - -
1926-27[c]	5.19	1.38	29.08	22.6
1931-32	2.34	.95	19.96	16.5
1941-42	2.84	1.02	21.51	17.9
1951-52	8.48	2.66	55.96	19.9
1959-60[d]	8.56	3.87	81.20	15.3
1971-72	16.00	6.93	145.43	15.8
1981-82	30.00	19.93	418.43	11.9

[a]Data are averages for the two years.

[b]Calculated as five percent of total cost per acre excluding the charge to management.

[c]First two years data available.

[d]Data not available for 1961-62; therefore, data for 1959-60 used.

Source: Various Illinois Detailed Cost Studies. Obtained by personal communication with Royce A. Hinton, University of Illinois.

CAPITALIZATION OF LAND VALUES

No Price Support Program

Assumptions

--- An average ownership life of 25 years, an opportunity cost of three percent (long-term real rate of interest), a corn price of $2.50 per bushel, a $2.00 per bushel cost of production, a yield of 120 bushels per acre, no expected change in corn price, cost of production, yield; and no expected appreciation of land values.

Value of Land

--- ($2.50-$2.00)(120) = $60/year
--- Therefore, the landowner has an annuity of $60/year for 25 years from owning the land.
--- Present Value of Annuity = $60 (17.41*) = $1044 per acre
--- Therefore, a rational farmer would bid $1044/acre for the land.

Effect of Price Support Program

Assumptions

--- Same as above except that a price support level of $2.75 per bushel is established by the government.

Value of Land

--- ($2.75-$2.00)(120) = $90/year

--- Present Value of Annuity = $90 (17.41*) = $1567 per acre

∴ The government price support program has increased the present value of land by $523/acre. A rational land owner would increase his land bid by a corresponding amount.

*Number taken from: Chemical Rubber Company. Standard Mathematical Tables. 17th ed. 1969.

COST CONCEPTS

VARIABLE COSTS - Costs associated with variable factors of production.

FIXED COSTS - Costs associated with fixed factors of production.

SUNK COSTS - Costs incurred during the production process as of the present point in the production process.

CASH COSTS - Cost which must be met by current funds. Funds could be internal funds or borrowed funds. If the latter, then the interest on borrowed funds becomes a cash cost. Cash costs equal or exceed variable costs.

SALVAGE VALUE - Value of a fixed factor of production in its best alternative use. The more specialized the input the lower its salvage value as a percent of its purchase value.

PURCHASED COSTS - Costs associated with inputs purchased in the market place.

RESIDUAL COSTS - Costs whose value are assigned by the manager at the end of the production process. These costs are assigned to purchased fixed factors of production which are completely paid off and to fixed factors not purchased in the market.

SHUTDOWN POINTS

$P < AVC$ Traditional shutdown point in economic theory for a purely competitive firm. Price does not cover variable costs so entire production process is shutdown.

$P < ACC$ Usually associated with bankruptcy. Average cash cost per unit of output cannot be covered. Individual moves out, resource bought by some other producer, no decline in production.

$DRF < SV$ Discounted long-term stream of revenue to a fixed factor of production is less than salvage value. Factor is moved out of production. If factor is land, then total crop production will decline. If factor is not land, production is not reduced, simply moves to other producers.

OTHER CONSIDERATIONS

Inputs are purchased until their cost equals their marginal value product or until their contribution is equal to that of all other factors of production (principle of equimarginal returns).

A firm can adjust to decline in revenues through reducing its payments to residual costs, selling off part of fixed inputs, or by reducing use of variable inputs.